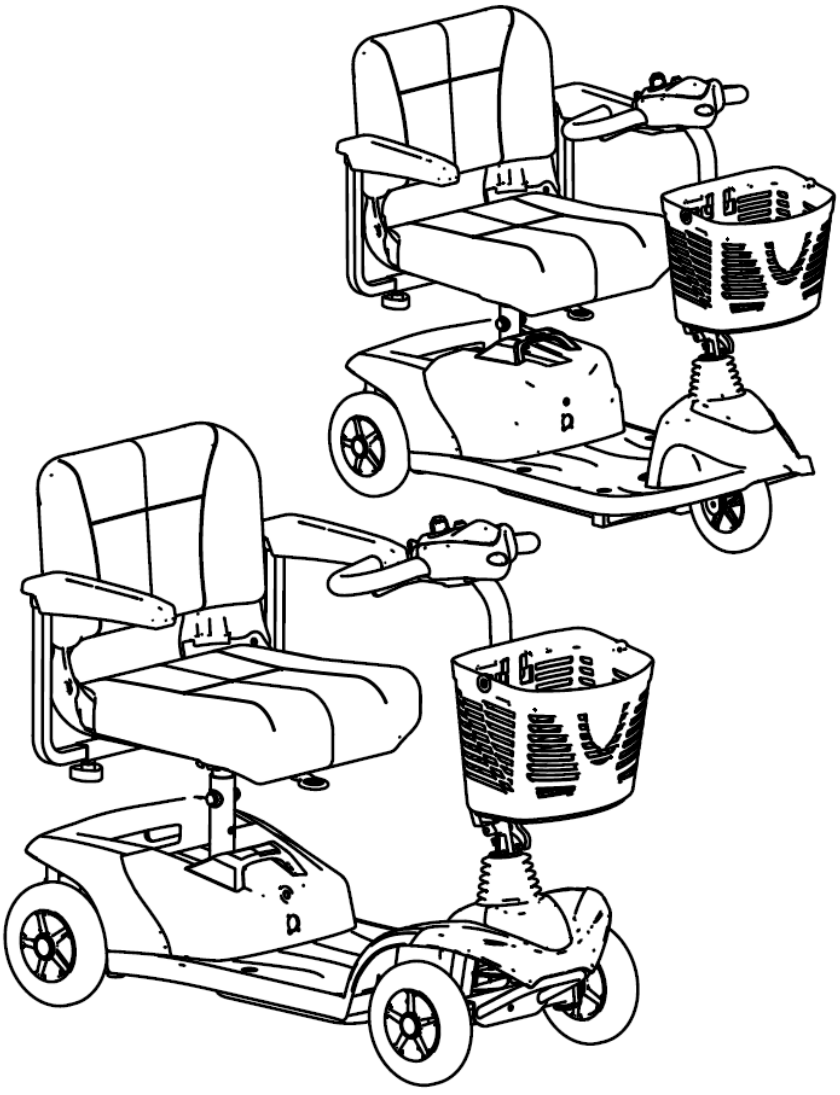
Invacare® Colibri

SERVICE MANUAL



CE

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INVACARE

These instructions contain information about:

Testing work

Repair Instructions

This manual is part of the instructions for use.

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1 Introduction

1.1 General information

- Service and maintenance work must be carried out taking this service manual into account.
- It is imperative that you observe safety information.
- Information about operation or about general maintenance and care work on the mobility aid should be taken from the operating manual.
- You can find information about ordering spare parts in the spare parts catalogue.
- Only use original Invacare® spare parts. The guarantee will become invalid if other spare parts are used!
- We reserve the right to make any alterations on the grounds of technical improvements.
- The mobility aid may only be maintained and overhauled by qualified personnel.
- The minimum requirement for service technicians is suitable training, such as in the cycle or orthopaedic mechanics fields, or sufficiently long-term job experience.
  - Experience in the use of electrical measuring equipment (multimeters) is also a requirement.
  - Special Invacare® training is recommended.
- Alterations to the mobility aid which occur as a result of incorrectly or improperly executed maintenance or overhaul work lead to the exclusion of all liability on the side of INVACARE.
- If you have any problems or questions please contact Invacare® Service.

1.2 Notes on transport

- If the mobility aid has to be shipped back to the manufacturer for major repairs, you should always use the original packaging for transport.
- Please attach a precise description of the fault.

1.3 Definition and representation of information and safety information in this manual

Different types of information and signal words are used throughout this manual.

HAZARD!

The signal word "HAZARD!" refers to immediate hazards.

· *The following lines in italics refer to actions which serve to avoid such hazards.*

WARNING!

The signal word "WARNING!" refers to possibly-occurring hazards which can lead to death or serious injuries if they are not avoided.

· *The following lines in italics refer to actions which serve to avoid such hazards.*

ATTENTION!

The signal word "ATTENTION!" refers to possibly-occurring hazards which can lead to minor injuries and/or material damage if they are not avoided.

· *The following lines in italics refer to actions which serve to avoid such hazards.*

CAUTION!

The signal word "CAUTION!" refers to hazards which could lead to material damage if they are not avoided.

· *The following lines in italics refer to actions which serve to avoid such hazards.*

Note

The signal word "Note" is used to denote general information which simplifies the handling of your product and refers to special functions.

1.4 Hazard symbols and symbols used

Different types of hazard symbols and symbols are used throughout this manual.

General hazards

This symbol warns you of general hazards!

· *Always follow the instructions to avoid injury to the user or damage to the product*!

BURN HAZARD!

This symbol warns you of the danger of chemical burns, for example due to the discharge of battery acids!

· *Always follow the instructions to avoid injury to the user or damage to the product*!

DANGER OF CRUSHING!

This symbol warns you of crushing hazards due to inattentive working with heavy components.

· *Always follow the instructions to avoid injury to the user or damage to the product*!

EXPLOSION HAZARD!

This symbol warns you of an explosion hazard, which can be caused by excessive tyre pressure in a pneumatic tyre.

· *Always follow the instructions to avoid injury to the user or damage to the product*!

Wear safety shoes

The symbol refers to the requirement for wearing safety shoes.

· *Wear standardised safety shoes during all work.*

Wear eye protection

This symbol refers to the requirement for wearing eye protection, for example when working with batteries.

· *Wear eye protection when this symbol is shown.*

Wear safety gloves

This symbol refers to the requirement for wearing safety gloves, for example when working with batteries.

· *Wear safety gloves when this symbol is shown.*

Note

This symbol identifies general information which is intended to simplify working with your product and which refers to special functions.

Requirements:

· This symbol identifies a list of various tools, components and items which you will need in order to carry out certain work. Please do not attempt to carry out the work if you do not have the listed tools available.

Always dispose used or damaged batteries correctly

The symbol refers to information for the correct disposal of used or damaged batteries.

1.5 Images in this manual

The detailed images in this manual are given digits to identify various components. Component numbers in text and operational instructions always relate to the image directly above.

2 Safety and fitting instructions

These safety instructions are intended to prevent accidents at work, and it is imperative that they are observed.

2.1 Before any inspection or repair work

- Read and observe this repair manual and the associated operating manual!
- Observe the minimum requirements for carrying out the work (see chapter entitled „General information)!

2.2 Personal safety equipment

Safety shoes

The mobility device, and some of its components, are very heavy. These parts can result in injuries to the feet if they are allowed to drop.

- *Wear standardised safety shoes during all work.*

Eye protection

It is possible that battery acid can be discharged when working on defective batteries or when handling batteries improperly.

- *Always wear eye protection when working on any defective or possibly defective batteries.*

Safety gloves

It is possible that battery acid can be discharged when working on defective batteries or when handling batteries improperly.

- *Always wear acid-proof safety gloves when working on any defective or possibly defective batteries.*

2.3 General safety information and information about fitting / removal

WARNING: Danger of crushing!

Various components such as the drive unit, batteries, seat etc are very heavy. This results in injury hazards to your hands!

- *Please note the high weight of some components! This applies especially to the removal of drive units, batteries and the seat.*

WARNING!

Injury hazard if the vehicle starts moving unintentionally during repair work!

- *Switch the power supply off (ON/OFF key)!*
- *Engage the drive!*
- *Before raising the vehicle, secure the wheels by blocking them with wedges!*

ATTENTION!

Fire and burn hazard due to electrical short-circuit!

- *The mobility device must be completely switched off before removal of voltage-carrying components! To do this, remove the batteries.*
- *Avoid short-circuiting the contacts when carrying out measurements on voltage-carrying components!*

CAUTION!

Danger of burns from hot surfaces on the motor!

- *Allow the motors to cool down before commencing work on them.*

ATTENTION!

Injury hazard and danger of damage to vehicle due to improper or incomplete maintenance work!

- *Use only undamaged tools in good condition*.
- *Some moving parts are mounted in sockets with PTFE coating (Teflon™). Never grease these sockets!*
- *Never use "normal" nuts instead of self-locking nuts.*
- *Always use correctly-dimensioned washers and spacers*
- *When reassembling, always replace any cable ties which were cut during dismantling.*
- *After completing your work / before renewed start-up of the mobility device, check all connections for tight fitting.*
- *After completing your work / before renewed start-up of the mobility device, check all parts for correct locking.*
- *Only operate the vehicle with the approved tyre pressures (see technical data).*
- *Check all electrical components for correct function. Please note that incorrect polarity can result in damage to the electronics.*
- *Always carry out a trial run at the end of your work.*

Note

Mark all current settings for the mobility aid (seat, armrests, backrest etc.), and the associated cable connecting plugs, before dismantling. This makes reassembly easier.
All plugs are fitted with mechanical safety devices which prevent release of the connecting plugs during operation. To release the connecting plugs the safety devices must be pressed in. When reassembling ensure that these safety devices are correctly engaged.

WARNING!

Any changes to the drive program can affect the driving characteristics and the tipping stability of the vehicle!

- *Changes to the drive program may only be carried out by trained Invacare® specialist dealers!*
- *Invacare® supplies all mobility aids with a standard drive program ex-works. Invacare® can only give a warranty for safe vehicle driving behaviour - especially tipping stability - for this standard drive program!*

3 Tightening torques

The tightening torques stated in the following list are based on the thread diameter for the nuts and bolts for which no specific values have been determined. All values assume dry and de-greased threads.

Thread	M4	M5	M6	M8	M10	M12	M14	M16
Tightening torque in Nm ±10%	3 Nm	6 Nm	10 Nm	25 Nm	49 Nm	80 Nm	120 Nm	180 Nm

CAUTION!

Damage can be caused to the mobility device due to improperly tightened screws, nuts or plastic connections.

- *Always tighten screws, nuts etc to the stated tightening torque.*
- *Only tighten screws or nuts which are not listed here fingertight.*

4 Service plan (1x annually)

Component	Check	Remedy	Notes	ü
Seat:	· Welded seams, fixings and upholstery	· Tighten screws, replace parts if damaged		
	· Seat suspension	· Grease the spring generously, replace parts if damaged	See Chapter 6.7.1.	
Frames (chassis) / battery mounting	· Check fixings, welded seams and battery mounting · Check battery fixing straps	· Tighten screws, replace parts if damaged		
Wheel suspension and wheels	· Check drive wheels for tight fit	· Tighten hub nuts, replace if necessary		
	· Check steering wheels for tight fit, float and side play	· Adjust / replace	See Chapter 6.5.	
	· Check tracking and steering linkage.	· Tighten screws · Check tracking and steering		
Drive units, coupling mechanism	· Check functions in drive and push modes · Check clutch mechanism. Plug in the middle must be movable.	· Replace motor if necessary · Tighten screws / nuts, adjust or replace	See Chapter 6.6.	
Batteries	· Check batteries for damage	· Replace batteries	See Chapter 6.3.1.	
	· Check battery voltage	· charge batteries	See operating manual.	
	· Check contacts and terminals	· Clean contacts and terminals		
Drive electronics	· Status display flashing · Fixing · Cable, connecting plug · Drive lever function · Power supply	· Evaluate blinking code · Tighten or replace fixing. · Replace cable, connecting plug. · Replace drive lever · Replace cable, connecting plug or console		
Drive program	· Check drive electronics program version. Newer version available?	· Update software	See Chapter 6.2.	

5 Operational Faults

Please proceed as follows if you have any problems:

- First assess the possible cause of the problem using the following table.
- Check the drive console status display. Evaluate the blink error code.
- Carry out the necessary checks and repairs as recommended in the following table.

5.1 Drive fault diagnosis

PROBLEM	OTHER SYMPTOMS	POSSIBLE CAUSE	SOLUTION	DOCUMENTATION
Scooter will not start	Status display on operating console does not illuminate	batteries defective	· Replace batteries	See Chapter 6.3.1.
		completely discharge battery	· Pre-charge batteries	
		Power supply to operating console possibly interrupted	· Check master fuse	See operating manual.
			· Check cable between modules for loose connections or damage	See Chapter 6.1.1.
		Operating console defective	· Replace operating console	See Chapter.6.1.2.
	Operating unit status display blinking	Various causes	· Assess error code	See Chapter 5.2.
Scooter judders in drive mode	None	Drive motor defective	· Replace motor(s)	See Chapter 6.6.1.
		Drive lever potentiometer defective	· Replacing the potentiometer	See Chapter 6.1.3.
Batteries not being charged	None	batteries defective	· Replace batteries	See Chapter 6.3.1.
	LEDs blinking on charging unit	Charging unit defective	· Replace charging unit	See charging unit operating manual.
Scooter runs too slowly	None	Operating console defective	· Replace operating console	See Chapter 6.1.2.
		batteries defective	· Replace batteries	See Chapter 6.3.1.

5.2 Error Codes and Diagnostic Codes

Blink code	Fault	Consequence for the Scooter	Comments
1	Battery must be charged	Continues to drive	· The batteries are discharged. Charge the battery as soon as possible.
2	Battery voltage too low	Stops driving	· The batteries are depleted. Charge batteries. · If you switch the Scooter off for a few minutes, the battery can often recuperate to such a stage that a short journey is still possible.
3	Battery voltage too high	Stops driving	· The battery voltage is too high. If the battery charger is connected, disconnect it from the Scooter. · The electronic system charges the batteries when running downhill and when braking. This fault is caused when the battery voltage becomes too high during this process. Switch the Scooter off and on again.
4	Power time exceeded	Stops driving	· The maximum current was exceeded over too long a period, probably because the motor was overloaded or has been working against an immovable resistance. Switch the scooter off, wait a few minutes and then switch on again. · The electronic system has determined a motor short-circuit. Check the wiring harness for short-circuit and check the motor. · Contact your Invacare® dealer.
5	Brake failure	Stops driving	· Ensure that the disconnection lever is pressed in. · There is a defect in the braking coil or in the cabling. Check the magnetic brake and cabling for open or short-circuited circuitry. Contact your Invacare® dealer.
6	No neutral position when switching Scooter on.	Stops driving	· Drive lever is not in neutral when the keyswitch was turned. Put the drive lever in neutral, turn the power off and then turn on again. · It may be necessary to recalibrate the drive lever. Contact your Invacare® dealer.

Blink code	Fault	Consequence for the Scooter	Comments
7	Fault in speed potentiometer	Stops driving	· The drive lever electronics could be faulty or incorrectly connected. Check the cabling for open or short-circuited circuitry. · Potentiometer is not correctly adjusted. Put the potentiometer into the centre position.
8	Motor voltage error	Stops driving	· The motor or its cabling is defective Check the cabling for open or short-circuited circuitry.
9	Miscellaneous internal fault	Stops driving	· Contact your Invacare® dealer.
10	Push/freewheel mode error	Stops driving	· The Scooter has exceeded the permissible maximum speed during pushing or freewheeling. Switch the electronics system off and on again.

6 Repair Work

6.1 Electronics

6.1.1 Replacing the electronic module

ATTENTION! Risk of accident.

When parking the scooter on the scooters support wheels it is no longer slowed by the engine brake. The scooter can roll away out of control.

- *Place the scooter rear frame on a supporting wooden block before you remove the wheels.*

ATTENTION!

Burn and scald hazard if power cable is short-circuited!

- *Turn off the power completely before removing any power supply components of the electric vehicle! Therefore take out the batteries.*
- *Avoid a bridging of the contacts during measurements on live electrical components!*

WARNING!

Any changes to the drive program can affect the driving characteristics and the tipping stability of the mobility aid!

- *Changes to the drive program may only be carried out by trained Invacare® specialist dealers!*
- *Invacare® can only give a warranty for safe mobility aid driving behaviour - especially tipping stability - for unaltered standard drive programs!*

ATTENTION! Risk of accident.

Accidental rolling can lead to accidents.

- *Secure the scooter against rolling away.*

Note:
The electronic system is supplied with a standard drive program. If you have carried out customer-specific modifications to the drive program, you will have to make these changes again after installing the new electronics module.

Note:
When disassembling, note the position of small parts such as screws and washers. Put small parts down so that they can be reassembled in the right sequence.

Requirements:

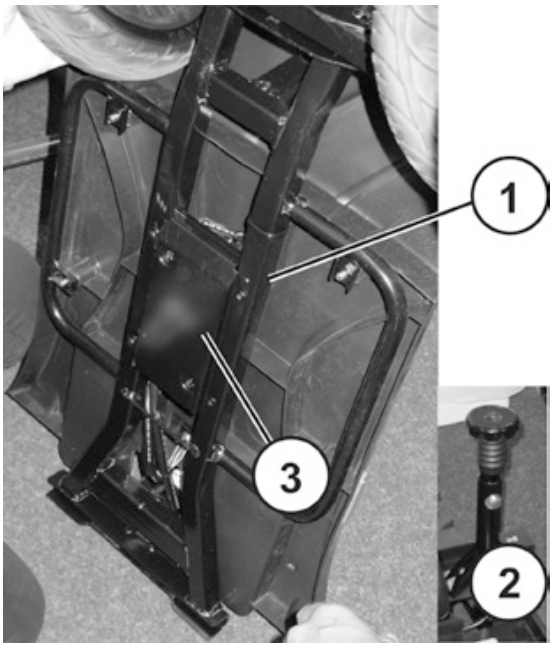
- Phillips screwdriver
- Supporting wooden block
- To adapt the drive program: programming software or hand programming device and electronics system installation manual, available from Invacare®.

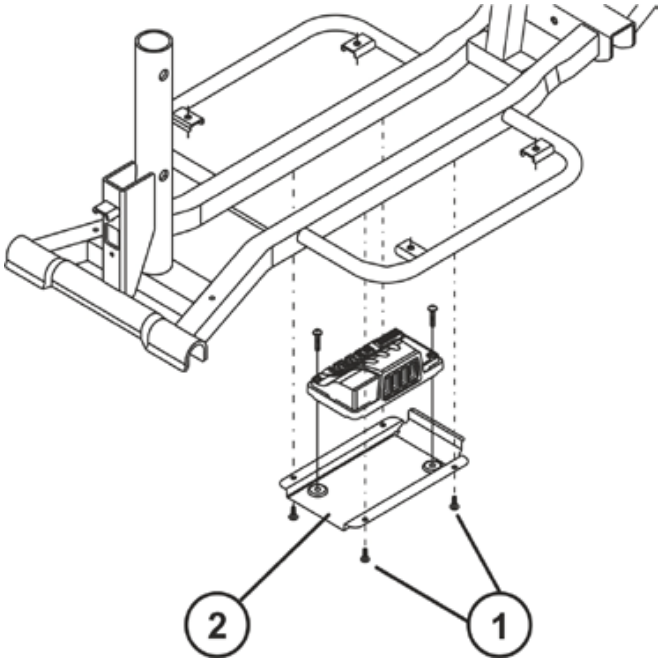
From the operation manual

- Remove the seat.
- Remove the battery boxes.
- Remove the drive unit.

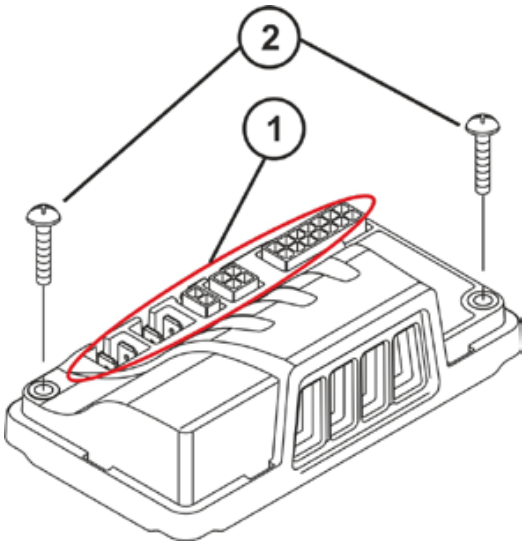
Further works:

- Place the chassis (1) upright on its seat adapter (2).
  The cover (3) of the electric module is located on the underside of the chassis.
- Secure the chassis against falling over.





- Remove the four screws (1) from electronics cover (2).
- Open the electronics cover.



- Remove all plugs (1) from electronics modul.

Note:
Take exact note of the positions of all cables and the sockets that they are connected to. Mark the connectors and sockets or take a photograph with a digital camera.

- Unscrew the screws (2) on both sides of the electronics module from the electronics cover and remove.
- Replace the electronics system.
- Reassembly takes place in the reverse order.
- Complete reassembly of vehicle.
- Test all functions (test drive).

6.1.2 Replacing operating console

ATTENTION!

Burn and scald hazard if power cable is short-circuited!

- *Turn off the power completely before removing any power supply components of the electric vehicle! Therefore take out the batteries.*
- *Avoid a bridging of the contacts during measurements on live electrical components!*

Note:
When disassembling, note the position of small parts such as screws and washers. Put small parts down so that they can be reassembled in the right sequence.

Requirements:
- Phillips screwdriver

From the operating manual:

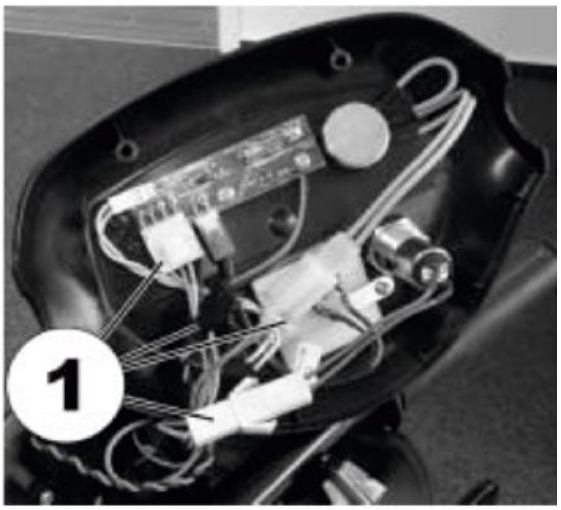
- Remove the seat
- Remove the battery boxes.

From the operating manual:

- Pull the cover (1) on the operating console upwards out of the fixing.

- Remove screws (1) from operating console.

- Remove all plugs (1) from operating console.
- Replace operating console.
- Reassembly takes place in the reverse order.
- Complete reassembly of vehicle.
- Test all functions (test drive)



6.1.3 Replacing the potentiometer

ATTENTION!

Burn and scald hazard if power cable is short-circuited!

- *Turn off the power completely before removing any power supply components of the electric vehicle! Therefore take out the batteries.*
- *Avoid a bridging of the contacts during measurements on live electrical components!*

CAUTION! Risk of accidents!

- *The new potentiometer must be set to the middle position before inserting. Potentiometers which are not in the middle position can result in dangerous driving situations!*

Requirements:

- Phillips screwdriver
- Allen key 2 mm
- Digital multimeter

From the operating manual:

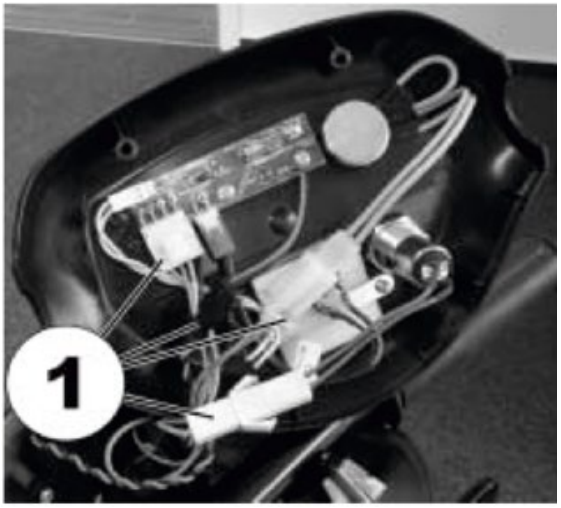
- Remove the seat.
- Remove the battery boxes.

Further works:

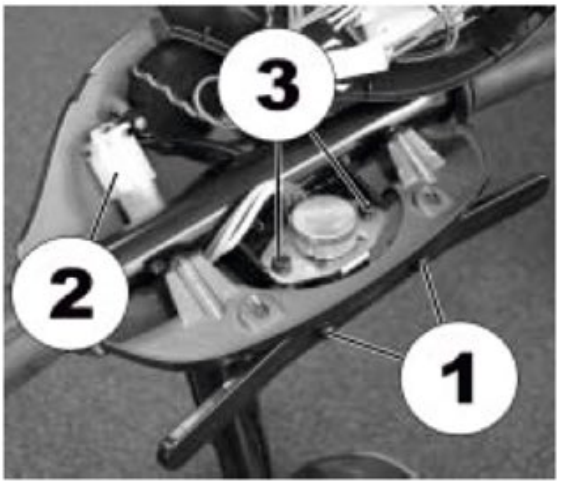
- Pull the cover (1) on the operating console upwards out of the fixing.

- Remove screws (1) from operating console.

- Remove plug (1) from the operating console.
- Replace operating console.

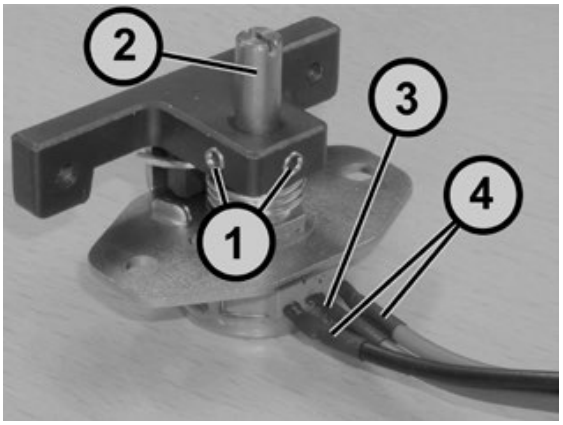


- Remove drive lever (1).
- Remove potentiometer plug (2) from the operating console.
- Remove potentiometer (3).
- Set the potentiometer to the middle position (see below).
- Reassembly takes place in the reverse order.
- Complete reassembly of vehicle.
- Check all operating console displays.



Setting the potentiometer to the middle position:

- Loosen the bolts (1) on the drive lever mounting.
- Twist the potentiometer shaft (2) until the same resistance (approx. 5kOhm) is measured between the central connection cable (3) and both outputs (4).
- Retighten the bolts on the drive lever mounting.
- Check settings and repeat the adjustment if necessary.



- Reassembly of the operating console takes place in reverse order.
- Check all functions (trial run).

6.2 Updating software

The driving programs for electric wheelchairs are continually updated and improved by Invacare®. For this reason, you should check whether the version number is still up to date each time a wheelchair comes in for repairs, and also during regular inspections.

If a newer version is available, the driving program must be updated. The procedure for updating the driving program is described in the user manual of the Wizard software.

Note
The electronic system is supplied with a standard drive program. If the driving program has been customised, you have to perform this customisation again, after installing the new driving program.

WARNING!

Any changes to the drive program can affect the driving characteristics and the tipping stability of the mobility aid!

- *Changes to the drive program may only be carried out by trained Invacare® specialist dealers!*
- *Invacare® can only give a warranty for safe mobility aid driving behaviour - especially tipping stability - for unaltered standard drive programs!*

Pre-requisites:

- Dynamic® Wizard software
- User manual for the Wizard software
- For further information on other requirements - such as the minimum system configuration of the PC to be used for programming, necessary programming cables - see the user manual of the Wizard software.

Note
Programming or updating the software takes place via the scooter charging socket.

6.3 Batteries

6.3.1 Removing the batteries

ATTENTION:

Injury hazard and possible material damages if batteries are handled improperly!

- *The installation of new batteries may only be carried out by authorised specialists.*
- *Observe the warning information on the batteries.*
- *Only use battery versions stated in the specifications.*

ATTENTION:

Fire and burns hazard if battery terminal is bypassed!

- *Please take great care to ensure that the battery terminals are never short-circuited with tools or mechanical mobility device parts!*
- *Ensure that the battery terminal caps have been replaced if you are not working on the battery terminals.*

ATTENTION: Danger of crushing!

The batteries are extremely heavy. This results in injury hazards to your hands.

- *Bear in mind that the batteries are sometimes very heavy!*
- *Please handle the batteries with care.*

WARNING: BURN HAZARD!

Injury hazard due to discharged acid.

- *Always wear acid-proof protective gloves when handling batteries.*
- *Always wear protective goggles when handling batteries.*

What to do if acid is discharged:

- *Always take clothing which has been soiled by or dipped in acid off immediately!*
- *Rinse any areas of your skin which has come into contact with battery acid off immediately with plenty of water!*

If contact with eyes is made:

- *Rinse the affected eye under running water for several minutes! You should also consult an eye specialist immediately afterwards!*

Requirements:

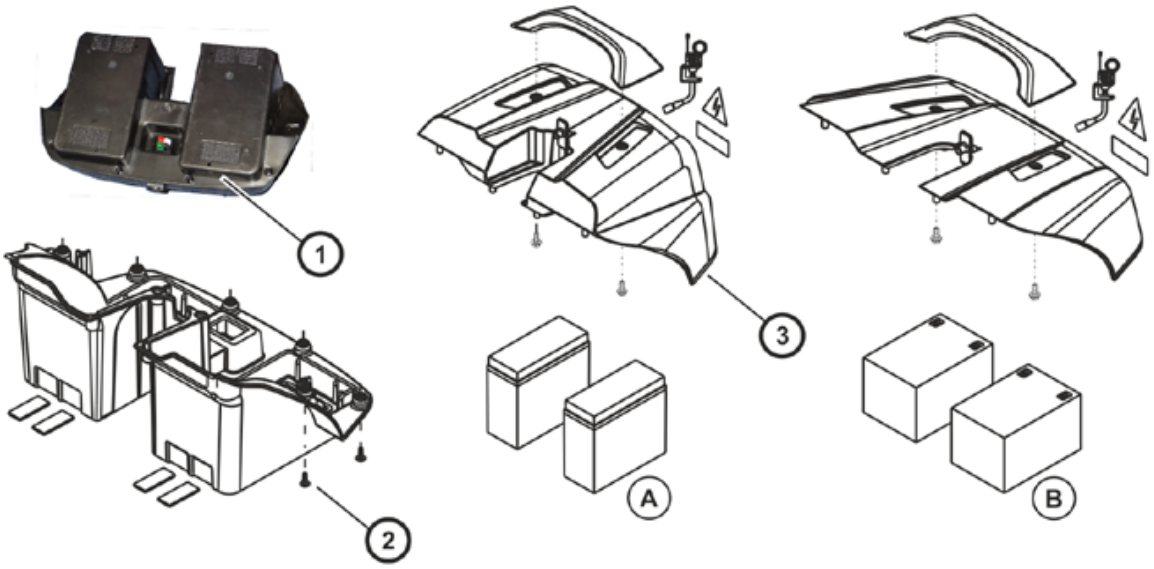
- Phillips screwdriver
- 2 open-ended spanner 8 mm (18 Ah battery only)

From the operating manual:

- Remove the seat.
- Remove the battery boxes.

Further works:

· Turn the battery box (1) upside down.

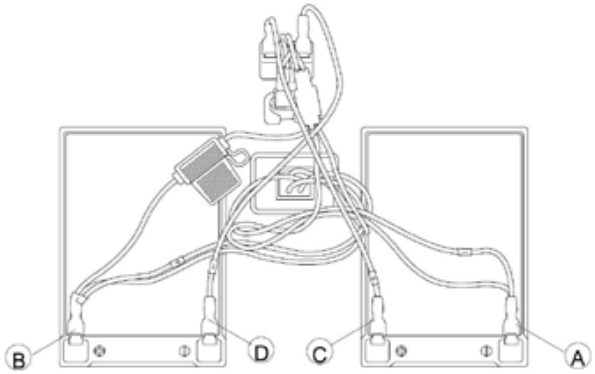


· Loosen and remove the twelve Phillips screws (2) from battery box.

· Carefully return the battery box (1) to the upright position and remove the battery cover (3).

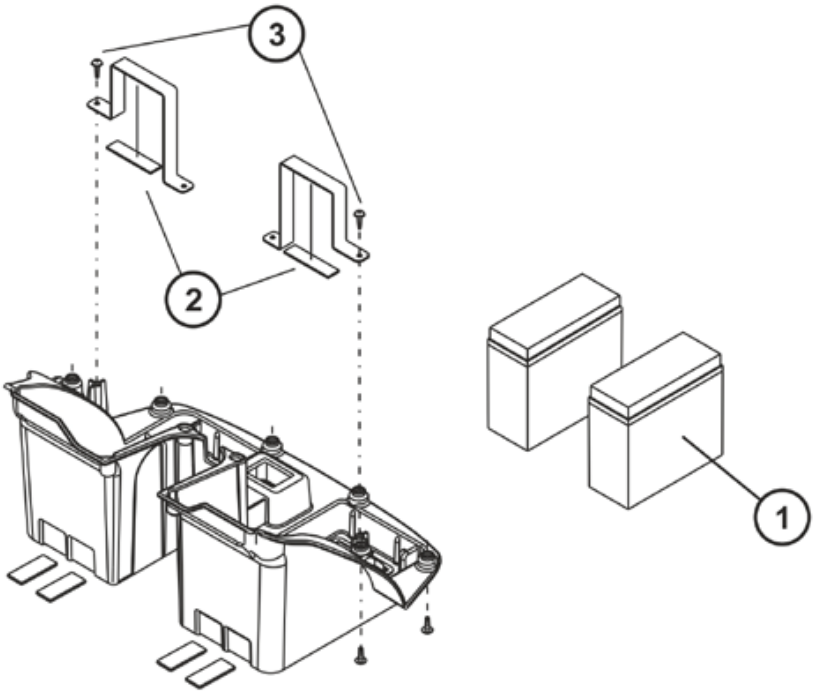
· Remove the all connecting plugs on the battery terminal. Depending on the battery type, disconnect the connectors as follows:

Ⓐ - 12 Ah batteries: Pull the plugs from the battery terminals.
Ⓑ - 18 Ah batteries: Loosen the screws and nuts with two open-ended spanners.



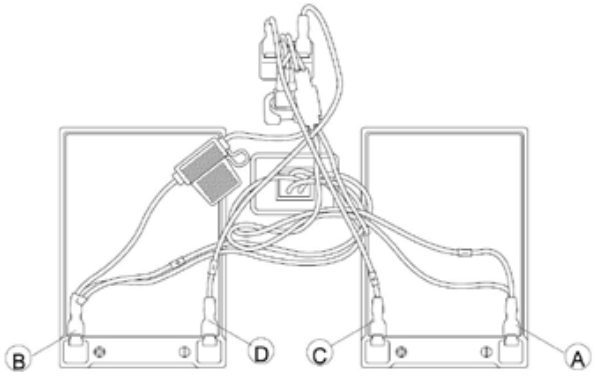
· Disconnect the cable harness from the batteries in the following order:

(-) BLACK	Cable **(A)** to the battery terminal (-)	on the right battery
(+) RED	Cable **(B)** to the battery terminal (+).	on the left battery
(+) WHITE	Cable **(C)** to the battery terminal (+).	on the right battery
(-) WHITE	Cable **(D)** to the battery terminal (-)	on the left battery



- The batteries (1) are held by clips (2) which are fixed by Phillips screws (3).
- Loosen the Phillips screws (3) and remove the clips (2).
- The batteries can now be removed and replaced.
- Install the two new batteries into the battery box and secure it with the clips (2).
- Connect the cable harness to the battery terminals.

  - 12 Ah batteries: Pull the plugs from the battery terminals.
  - 18 Ah batteries: Loosen the screws and nuts with two open-ended spanners.



- Connect the cable harness from the batteries in the following order:

(-)	BLACK	Cable **(A)** to the battery terminal (-) on the right battery
(+)	RED	Cable **(B)** to the battery terminal (+). on the left battery
(+)	WHITE	Cable **(C)** to the battery terminal (+). on the right battery
(-)	WHITE	Cable **(D)** to the battery terminal (-) on the left battery

- Replace the cover of the battery box and secure with the twelve mounting screws.
- Reinstall the battery boxes on to the scooter frame (chapter 6.3.2).

6.3.2 Installing/removing the battery boxes

The installation of the battery boxes in the scooter is described in the user manual.

6.3.3 Correct handling of damaged batteries

WARNING: BURN HAZARD!

Injury hazard due to discharged acid.

- *Always wear acid-proof protective gloves when handling batteries.*
- *Always wear protective goggles when handling batteries.*

What to do if acid is discharged:

- *Always take clothing which has been soiled by or dipped in acid off immediately!*
- *Rinse any areas of your skin which has come into contact with battery acid off immediately with plenty of water!*

If contact with eyes is made:

- *Rinse the affected eye under running water for several minutes! You should also consult an eye specialist immediately afterwards!*

Requirements:

- protective goggles
- acid-proof gloves
- acid-proof transport container

- If handling damaged batteries, always wear suitable protective clothing.
- Always deposit damaged batteries in suitable acid-proof containers immediately after removal.
- Only transport damaged batteries in suitable acid-proof containers.
- Always wash any objects which were contacted by acid in plenty of fresh water.

Always dispose of used or damaged batteries correctly

Used and damaged batteries will be taken back by your medical equipment supplier or Invacare®.

6.4 Checking the cables

- Switch the electronics OFF on the operating control.
- Check all cables for visible damage, crushing points or abrasion points.
- Replace damaged cables.
- Pull on each plug carefully. The plug must not come out of its socket when pulled on lightly.
- If a plug is loose, apply slight pressure to push the plug into the socket. The plug must snap in place securely.
- Check that the plug is firmly attached to its socket.
- Remove the batteries, as described in chapter 6.3.
- Check the battery cables for visible damage, crushing points or abrasion points.
- Replace damaged cables.
- Assemble all parts again in reverse order.
- The last step is to test all functions of the vehicle.

6.5 Wheels

6.5.1 Assembling and disassembling the front wheel/axle (3-wheel version)

CAUTION: Danger of accidents!

Accidents may result from standing the chassis upright on its end!

· *Secure the chassis against falling over!*

WARNING!

Danger of damage to the scooter! The plastic cover can be damaged if you attempt to lift the vehicle by its cover!

· *Only lift the vehicle by the chassis.*

Note

Pay attention to the positions of small parts such as screws and washers during disassembly. Put small parts aside in such a way that they can be re-fitted in the correct order.

Requirements:

· Open spanner 12 mm

· Open spanner 13 mm

· Self-locking nut 13 mm

From the operation manual:

· Remove the seat.

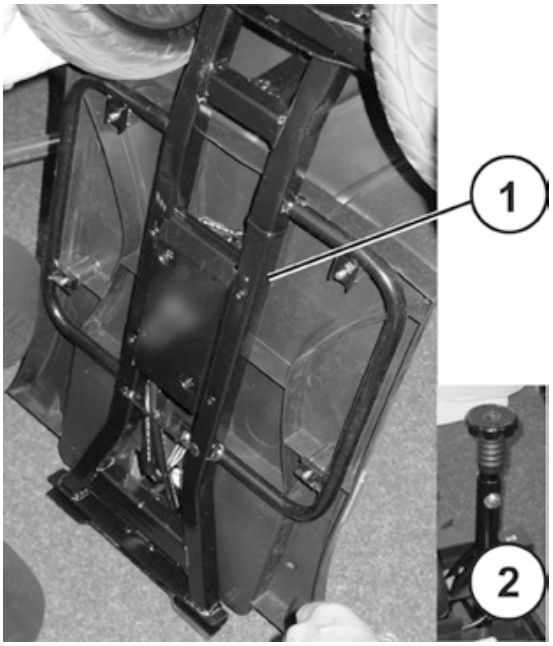
· Remove the battery boxes.

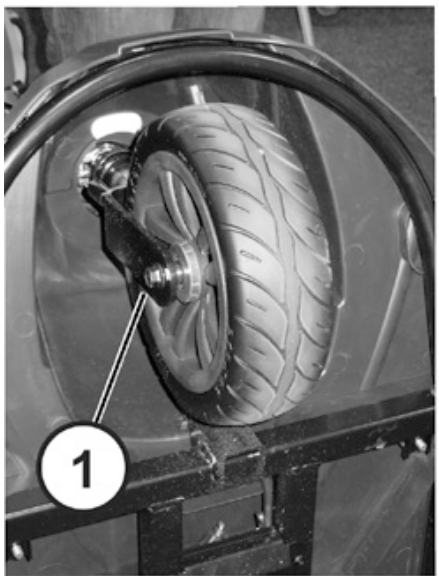
· Remove the drive unit.

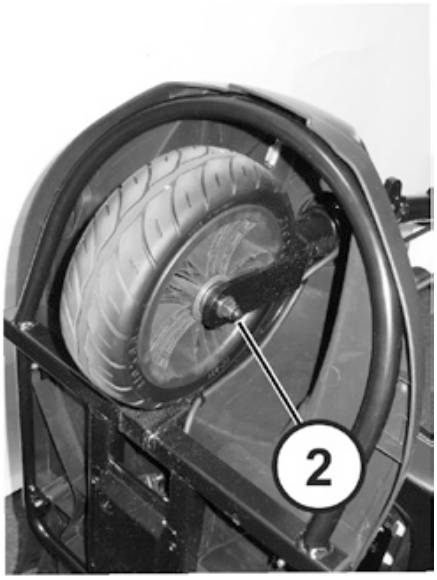
Weitere Arbeiten:

· Place the chassis (1) upright on its seat adapter (2).

· Secure the chassis against falling over.







Removing the wheel:

- Loosen the Self-locking nut (1) with a 13 mm open spanner. Secure the axle bolt (2) against slippage using a 12 mm open spanner.
- Remove the axle slowly.
- Remove the wheel along with the distance bushings and washer.

Assembling the wheel:

- Assembly of the wheel is carried out in the reverse order.
- Pay attention to the correct position of the distance bushings and washer.
- Use a new self-locking nut.
- Test all functions (test drive)

6.5.2 Replacing the front axle (4-wheel version)

CAUTION: Danger of accidents!

Accidents may result from standing the chassis upright on its end!

· *Secure the chassis against falling over!*

WARNING!

Danger of damage to the scooter! The plastic cover can be damaged if you attempt to lift the vehicle by its cover!

· *Only lift the vehicle by the chassis.*

Note

Pay attention to the positions of small parts such as screws and washers during disassembly. Put small parts aside in such a way that they can be re-fitted in the correct order.

Requirements:

· Open spanner 17 mm

· Open spanner 12 mm

From the operation manual:

· Remove the seat.

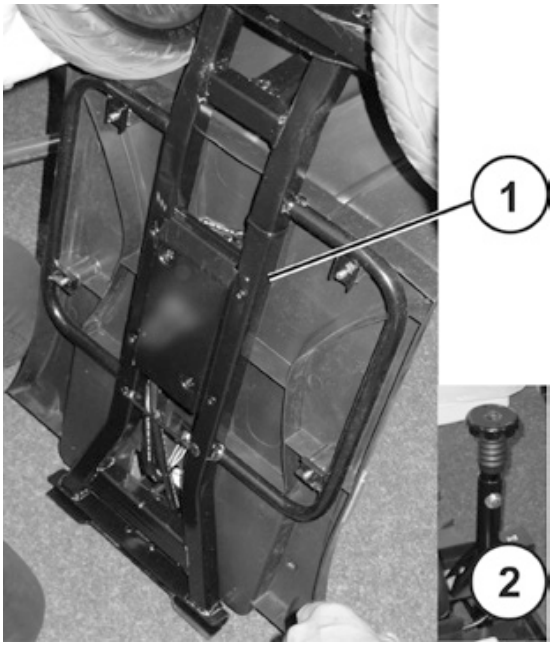
· Remove the battery boxes.

· Remove the drive unit.

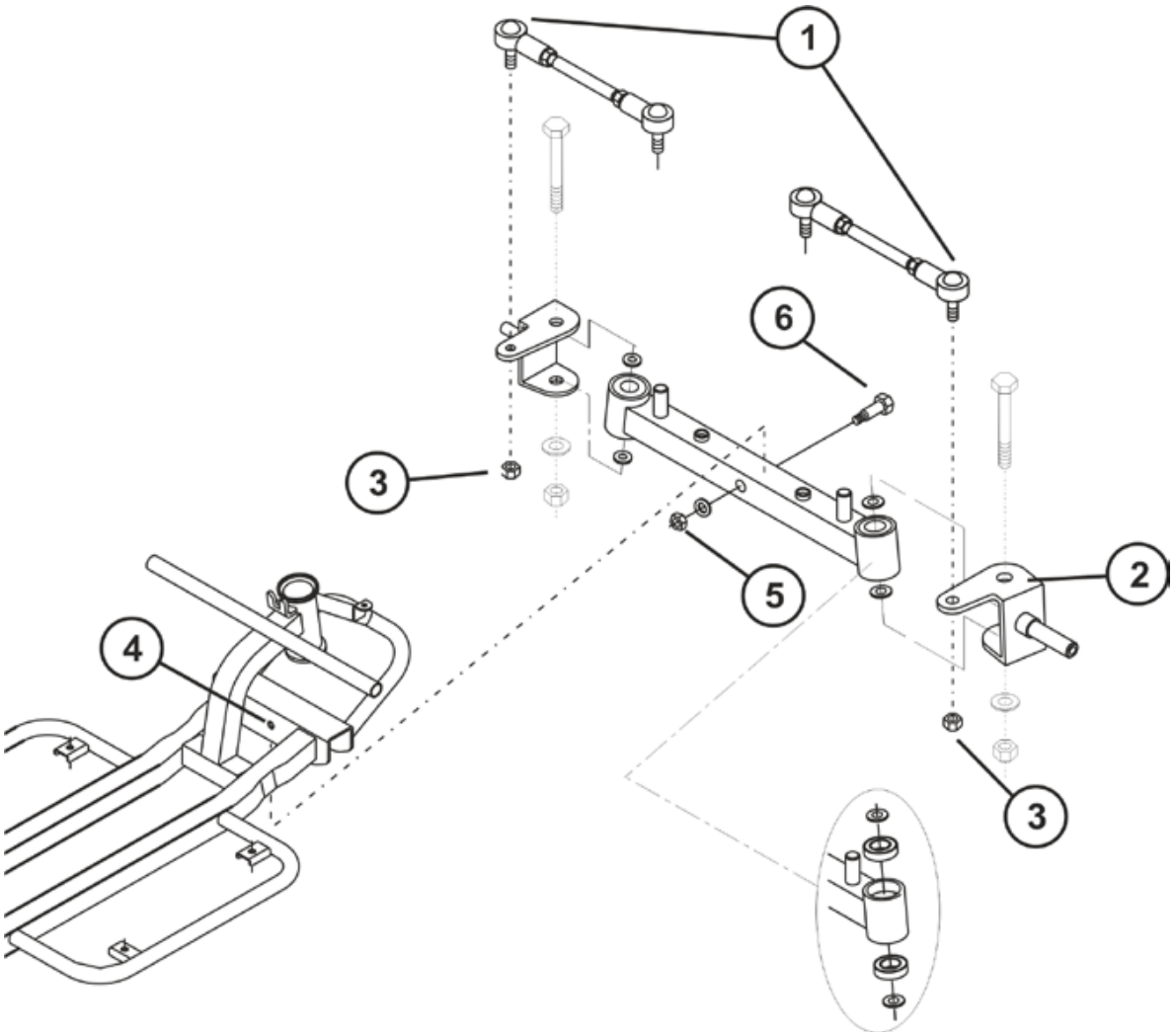
Further works:

· Place the chassis (1) upright on its seat adapter (2).

· Secure the chassis against falling over.



- Remove the front wheels (1), as described in chapter 6.5.3.



- Loosen and remove the nut (3) on the track rod (1).
- Remove track rod (1) from the steering plate (2).
- Loosen and remove the nut
- Loosen the nut of the axle suspension (5) and remove it incl. washer.
  Counter the axle suspension bolt (6) with a spanner so it cannot rotate while performing this task.
- Pull the bolt (6) out and remove the axle assembly from the chassis (4).

Note
Counter the tie rod end with a spanner while removing the nut (3) so it cannot rotate.

- Re-assembly of the axle is carried out in the reverse order.
- Test all functions (test drive).

6.5.3 Assembling and disassembling the wheels (4-wheel version and rear wheels on the 3-wheel version)

ATTENTION! Risk of accident.

When parking the scooter on the scooters support wheels it is no longer slowed by the engine brake. The scooter can roll away out of control.

· *Place the scooter rear frame on a supporting wooden block before you remove the wheels.*

ATTENTION! Risk of accident.

Accidental rolling can lead to accidents.

· *Secure the scooter against rolling away.*

NOTE:
When disassembling, note the position of small parts such as screws and washers. Put small parts down so that they can be reassembled in the right sequence.

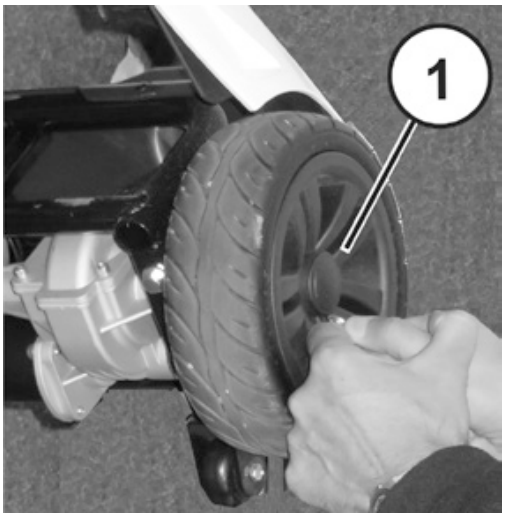
Requirements:

· Open spanner 12 mm
· Rubber hammer
· Flat screwdriver
· Self-locking nut 12 mm
· Block of wood

· Secure the scooter against rolling away.
· Position the block of wood under the frame in the vicinity the battery box.

Removing the wheel:

· Remove the protection cap (1) with a flat screwdriver.
· Use the 12 mm open spanner to loosen the lock nut.
· Remove the wheel.
· If necessary, loosen the wheel by tapping it lightly with a rubber hammer.



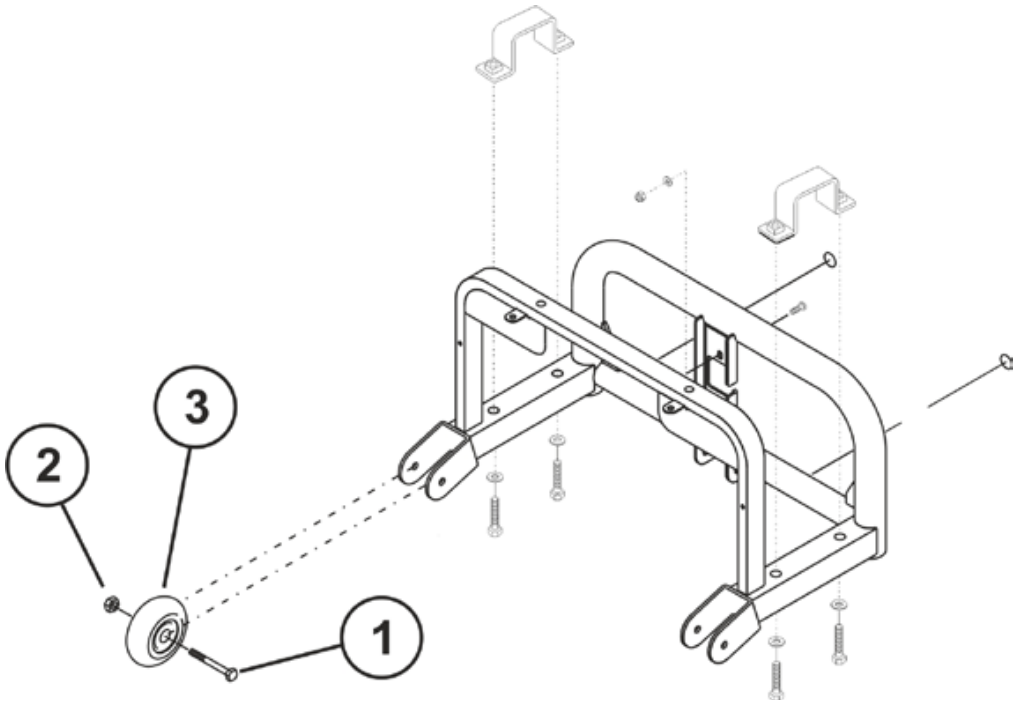
Assembling the wheel:

· Assembly of the wheel is carried out in the reverse order.
· Use a new self-locking nut.
· Test all functions (test drive).

6.5.4 Anti-tipper wheels

Requirements:
- 2 open spanner 10 mm

Removing the anti-tipper wheel:



- Loosen the screw (1) with a 10 mm open spanner. Secure the axle (4) against slippage using a second 10 mm socket open spanner.
- Remove the screw (1) and the axle nut (2).
- Pull the wheel (3) off of the axle.
- Replace the wheel.

Assembling the anti-tipper wheel:
- Assembly of the wheel is carried out in the reverse order.
- Tighten the self-securing axle nuts just tight enough that the wheel can still rotate without resistance.

6.6 Drive unit

6.6.1 Replacing the drive motor

ATTENTION! Risk of accident.

When parking the scooter on the scooters support wheels it is no longer slowed by the engine brake. The scooter can roll away out of control.

· *Place the scooter rear frame on a supporting wooden block before you remove the wheels.*

ATTENTION! Risk of accident.

Accidental rolling can lead to accidents.

· *Secure the scooter against rolling away.*

Note:
When disassembling, note the position of small parts such as screws and washers. Put small parts down so that they can be reassembled in the right sequence.

Note:
The plugs on the electronic module cannot be wrongly connected because all plugs have a different size and only fit in one socket.

Requirements:

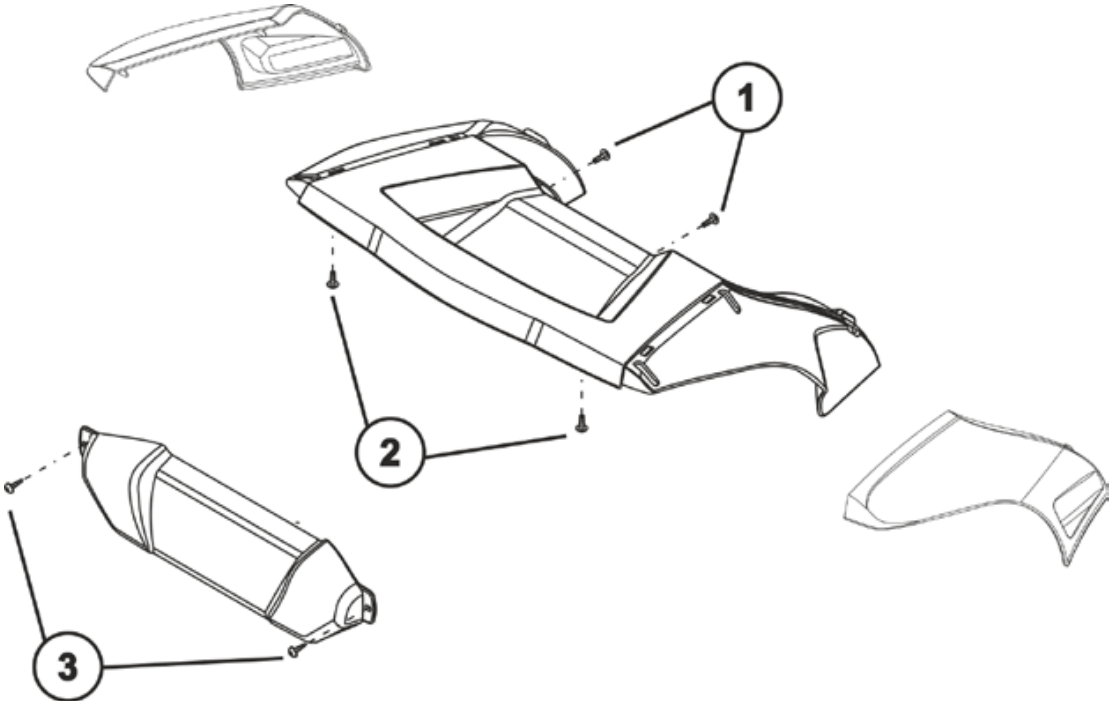
· Open spanner, 13 mm.
· Open spanner, 8 mm
· Phillips screwdriver
· Rubber hammer
· Supporting wooden block
· Cable ties

From the operating manual:

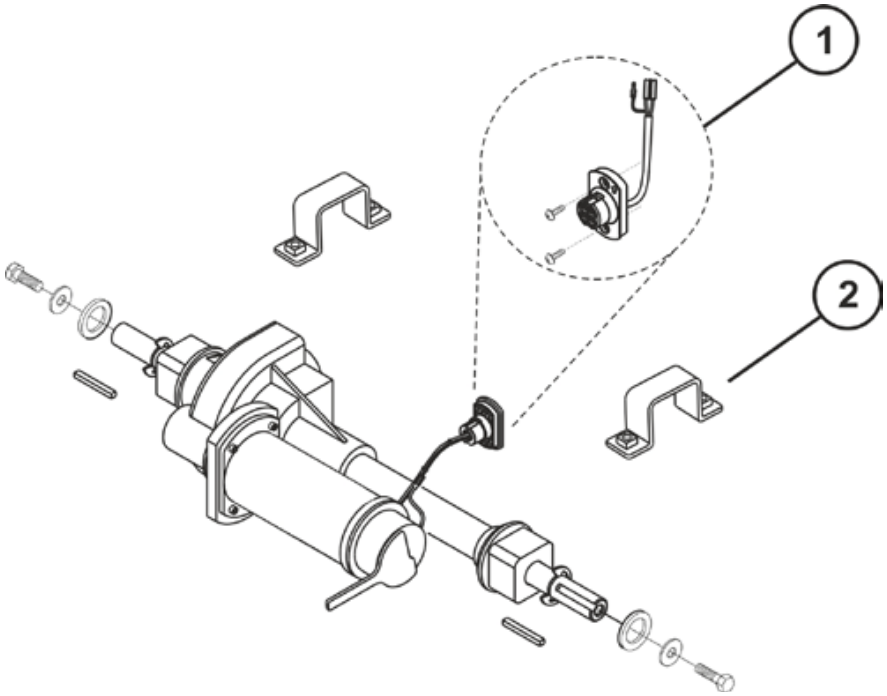
· Remove the seat.
· Remove the battery boxes.
· Remove the drive unit.

Further works:

· Support the drive unit with a wooden wedge.



- Loosen and remove the fixing bolts (1), (2) and (3) on the rear cover.
- Remove the rear cover from the chassis.



- Undo the screws (2) with crosshead screwdriver and counter them using an 8 mm open-ended spanner.
- Unplug the drive motor plug (1) of the socket strip.
- Fold the drive to the rear onto the chassis and the anti-tipper wheels.
- Loosen the fixing screws of the rear wheels.
- Remove wheels, as described in chapter 6.5.3.

- Remove motor downwards out of the vehicle frame.
- Change the motor.
- Reassembly of the motor takes place in reverse order.

Note
Fit the motor plug floating. This means you should ensure that the plug still has a little play after the bolts have been tightened. Tighten the bolts to max. 1.5 Nm.

- Secure motor cable with cable tie.
- Complete reassembly of vehicle.
- Test all functions (test drive).

6.7 Seat system

6.7.1 Replacing the seat suspension / spring

ATTENTION! Risk of accident.

Accidental rolling can lead to accidents.

· *Secure the scooter against rolling away.*

Note:
When disassembling, note the position of small parts such as screws and washers. Put small parts down so that they can be reassembled in the right sequence.

Note

The following seat support tubes are available for the seat suspension:

User weight	Length of the seat support
0 – 136 kg	425 mm
	475 mm
	450 mm

Requirements:

· 2 open spanner 17 mm

· 1 open spanner 13 mm

· Grease

From the operating manual:

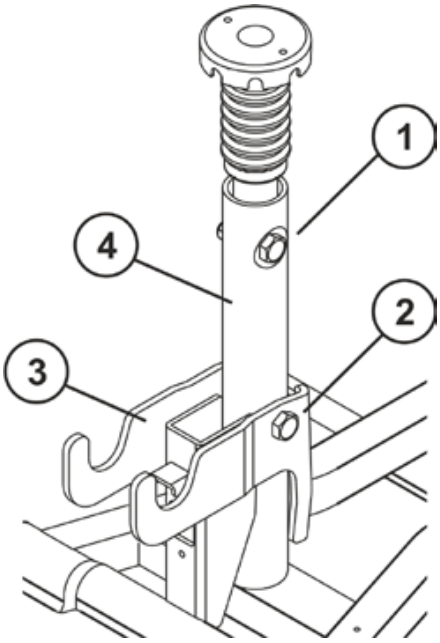
· Secure the scooter against rolling away.

· Remove the seat.

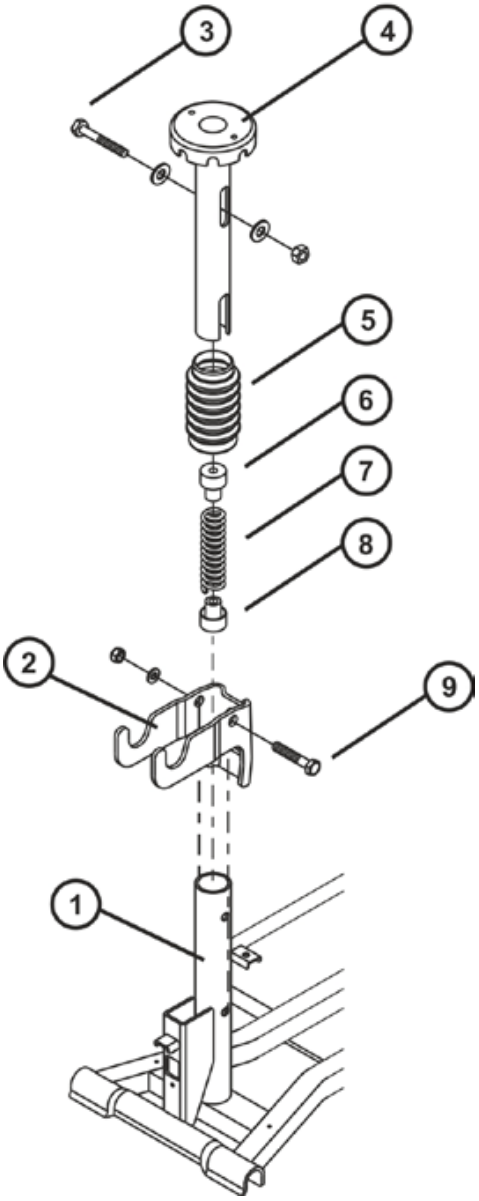
Further works:

· Undo the bolted connection (1) on the mounting sleeve (4) with a 17 mm open-ended spanner, and counter it using another 17 mm open-ended spanner.

· Undo the bolted connection (2) on the rear closure (3) with a 17 mm open-ended spanner, and counter it using a 13 mm open-ended spanner.



- Remove the bolts (3 und 9), nut and washers.
- Remove the seat support tube (4) from the receptacle tube (1).
- Remove the concertina type cover (5) including the spring (7) and the plastic end pieces (6 and 8).
- Fit the plastic end pieces (6 and 8) to the new spring.
- Grease the spring generously. The spring should be covered completely.
- Install the concertina type cover (5) including the spring (7) and the plastic end pieces (6 and 8).
- Insert the seat support tube (4) into the receptacle tube (1) and press down gently.
- Reposition the bolts (3 und 9), nut and washers. Firmly tighten the seat support bolt.



7 Accessories

7.1 Battery charger

See operation manual.

7.2 Connection tube

The connection tube (1) can be fixed to the underside of the seat frame for various accessory parts, for example an additional shopping basket, fixing for oxygen bottle (see chapter 7.3 Further accessories).

ATTENTION! Risk of accident.

Accidental rolling can lead to accidents.

· *Secure the scooter against rolling away.*

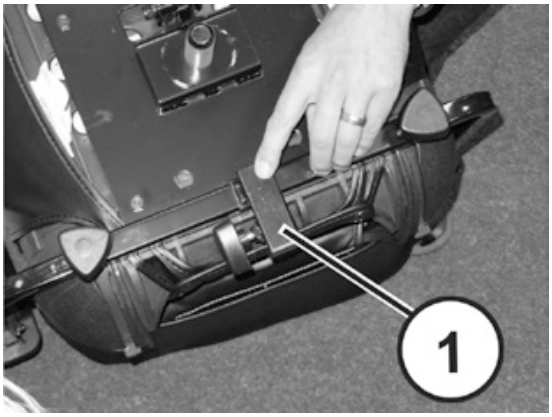
Requirements:

· 10 mm open spanner

From the operation manual:

· Remove the seat.

· Turn the seat over so that the underside of the seat is facing upwards.

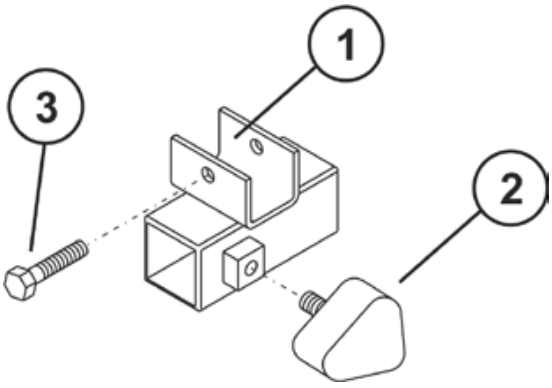


Further works:

· Push the bracket (1) to the centre of the seat frame and check the drill hole while doing so.

· Tighten the screw (3) with an open spanner.

· Tighten the handwheel (2).



7.3 Further accessories

Note

The installation instructions for additional accessories are available at your Invacare® specialist supplier or directly from Invacare®.